Acid Recycling with Filtration and PRO-pHx

Presented By:

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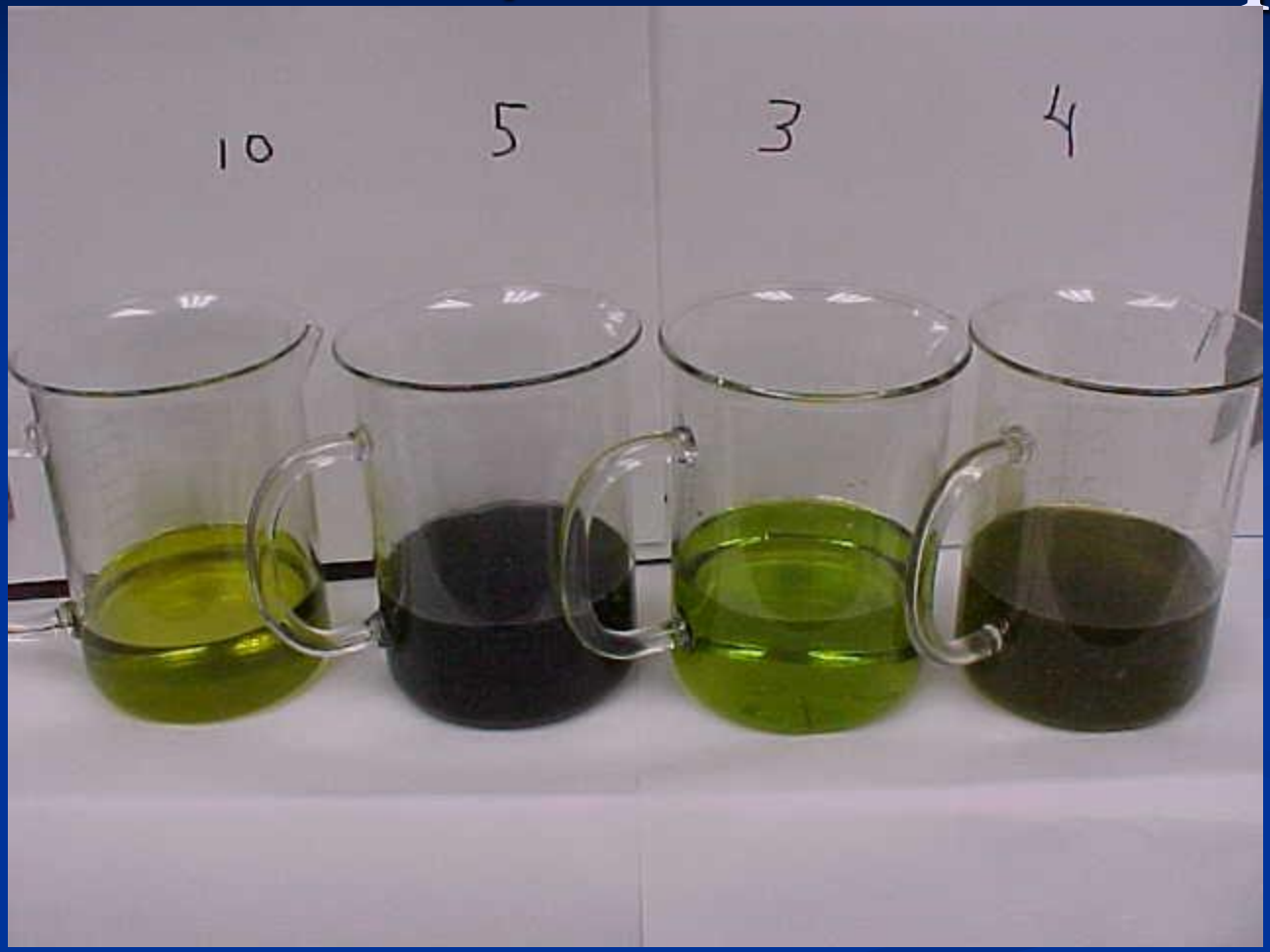
A Catalyzed Reagent Chemistry with Filtration

- Reduces Acid Disposal for On-site Treatment or Off-site Disposal
- Reduces Virgin Acid Requirements

REDUCES VIRGIN ACID REQUIREMENTS 30 - 50 %
REDUCES FILTERED SOLIDS 30 - 80 %

50% HCl with/without PRO-pHx



3 YR OLD NITRIC AND HCl

Acid Life Extender

Acid Applications

- Acid Pickling
- Stripping Baths
- Activation Baths
- Stainless Steel Passivation Baths
- Anodizing
- Electropolishing

PRO-pHx Acid Life Extender

***Chemistry* Has Been Use In To Remove Organics And To Keep Metals At Low Levels In the Following Acid Types**

Hydrochloric / Muratic	5% to 95% By Volume	55 to 160 F
Nitric	10% to 80% By Volume	60 to 120 F
Sulfuric	10% to 95% By Volume	34 to 190 Ft
Citric	7% to 15% By Volume	60 to 125 F
Phosphoric	7% to 15% By Volume	60 to 115 F
Nitric & Ammonium Bifloride	40% to 70% By Volume	70 to 80 F
Acid Salts	7% to 15% By Volume	70 to 90 F
Nitric & Phosphoric	15% to 20% By Volume	105 to 115 F
Sulfuric & Oxalic	18% By Volume	Proprietary
Sulfuric & Phosphoric	18% By Volume	105 to 115 F
Hydrochloric & Acid Salts	15% to 20% By Weight	70 to 95 F
Nitric & Hydrofluoric	15% to 20% By Volume	70 to 115 F
Sulfuric & Hydrofluoric	20% By Volume	115 to 130 F

Effective Metals Reduction Include

Iron, Zinc, Nickel, Copper, Cadmium,

Acid Life Extender

Benefits

Eliminates Costly Disposal Methods

No Caustic for Neutralization of Acids
No Off Site Acid Disposal

Eliminates Environmental Issues Associated With Acid Disposal

Reduces Dissolved Solids to Waste Treatment
Reduces Solid Waste Generation Volume
Reduces TSS & TDS Loads to UF & RO Polishing Systems

Acid Life Extender

How Does the Chemistry Work?

Chemistry **is a catalyzed formulation carried by a proprietary blend of soluble silicates.**

It effectively precipitates soluble metals and organics to form insoluble metal silicates.

Technology Benefits Include

- **Eliminates Acid Dumps/Acid Disposal**
- **Lower Acid Concentrations for Pickling**
- **Maintains Acids Near Optimum Effectiveness**
- **Lower HCl Emissions to the Atmosphere**
- **Controls Metals Build-Up**
- **Reduces Virgin Acid Purchases**
- **Extends Acid Life Indefinitely**

Return On Investment Example

- **Metal Finishing Shop**

Before *Chemistry* Application

45,000 gallons of acids per year, approximately $75,000
Cost of waste treatment per year, approximately $93,750
(including caustic, solid waste disposal and labor)

Total Cost $168,750

Return On Investment

- **Metal Finishing Shop**

After C*hemistry*Application (1st Year)

6,750 gallons of acids per year, approximately	**$11,475**
***Chemistry* required, approximately**	**$ 9,000**
Pumps required, approximately	**$ 5,000**
Filters required, approximately	**$ 5,000**

Total Cost $30,475 **Savings: $138,275**

ROI: Approximately 12 Weeks

$ 30, 475 / $ 138, 275 = 0.22 year x 52 = **11. 5 Weeks**

Application Guidelines

APPLICATION

- Add *chemistry* at 1% to total tank volume
- Filter to produce 1 to 2 turnovers per hour
- 1-100 micron filtration

Metals Reduction – Zinc Line

Before *chemistry* - 4 Weeks *Results in ppm*

Iron	Zn	Ni	Cu
750	370	105	55

After *chemistry* - 12 Weeks

Iron	Zn	Ni	Cu
170	150	47	33

Electro Galvanizing Plant

Before *chemistry*

350 G 40% HCl tank
Acid Dumped weekly @ 4% Fe

After *chemistry* ***March, 2003***

Fe stabilized @ 2.8%
No Acid dumps
Treated Acid Stabilized
Production Quality Consistent

Cost Savings

$ 12, 490 / year

Electroplating Plant

Before *chemistry*

2) 500 G HCl Tanks Disposed of Monthly

After *chemistry*

No Acid Disposal - More Than 3 Years
95% Reduction in F006 Waste
Reduced Downtime for Maintenance
Reduced HCl Usage
Reduced NaOH Usage
10 Fold Reduction in Rinse Contaminates

Hot Dip Galvanizing Company

Before *chemistry*

15,000 G HCl Tank

5,000 G HCl Disposed of Weekly

Dumped at 7% Fe

Annual Cost: $260,000 per year

After *chemistry* ***May, 2003***

Zero Acid Disposal Since 5/03 = 7 + years

Pickling – Excellent at 7% Fe

Savings: $250,000 per year

Electroplating Plant – Rack & Barrel Lines

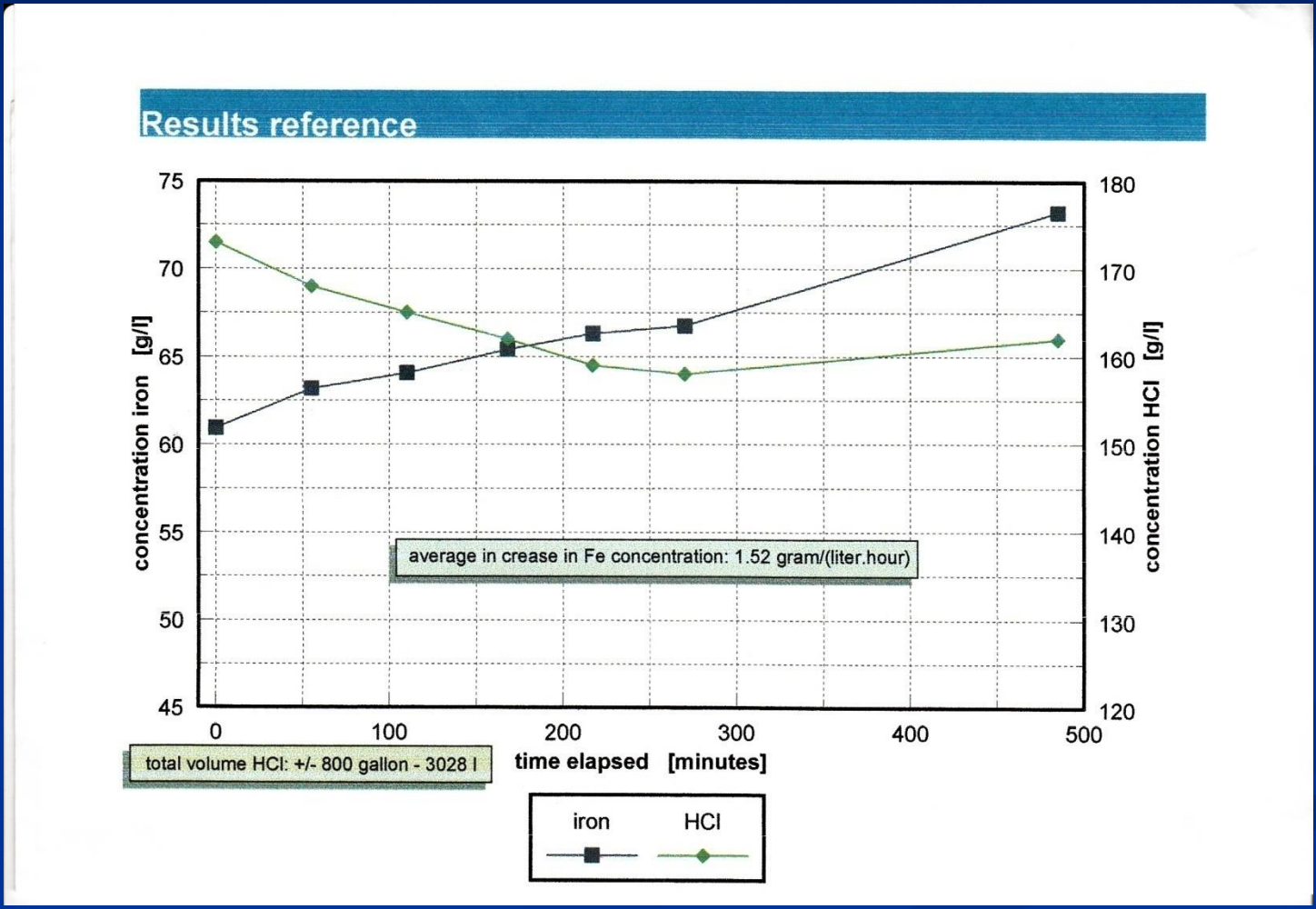
Before *chemistry*

Dumped HCl, HNO_3 H_2SO_4 Tanks

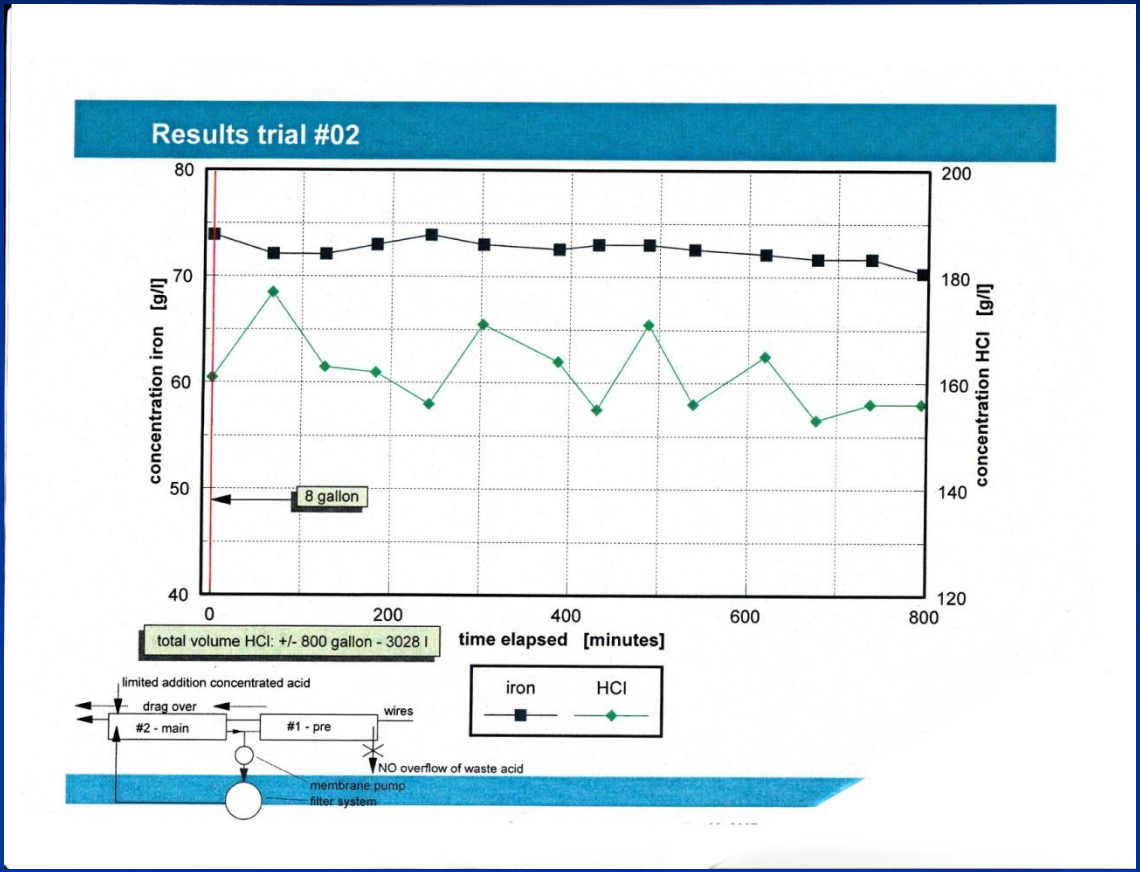
After *chemistry*

No Acid Disposal 3 + Years
Verified Reductions
NaOH 34.5%
HCl 74.0%
Hazardous Waste 34%

Before Chemistry at Wire Plant



After Chemistry at Wire Plant



Benefits to Wire Plant

- Waste acid hauling reduced by 90%
- Virgin acid purchases reduced by 30%
- Iron and acid loads to waste treatment reduced by 75%
- Reduced frequency of permanganate treatment on zinc sulfate solution

Electropolishing Case history

Year	Cost of Virgin A
2003	$23,040
2004	$11,600
2005	$6,755
2006	0 (virgin material was left over from 2005)
2007	$1,500

Filter cartridges are removed from an electropolishing tank for cleaning or replacement. Operators wipe sludge from polyspun filter cartridge to enable reuse four to six times

Electropolishing Additional Benefits

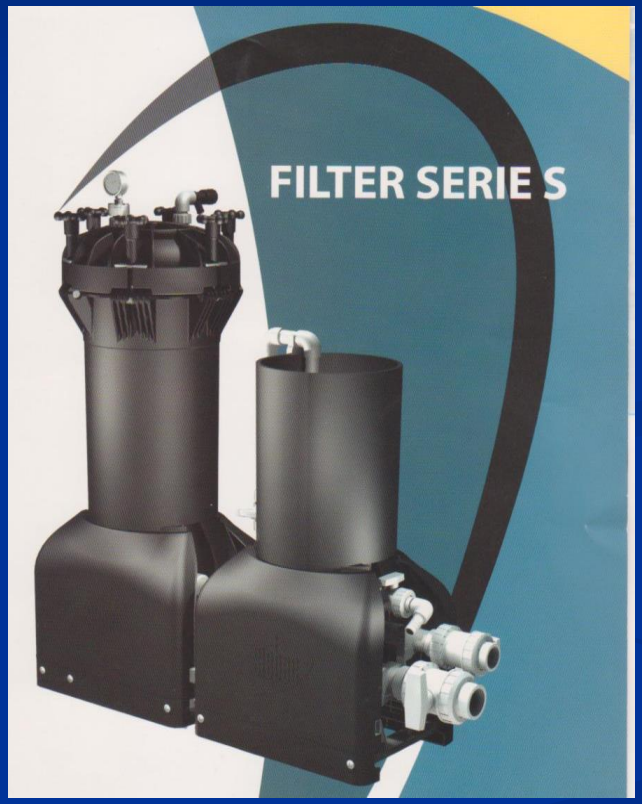
- Consistent Production Quality
- No production downtime for decanting
- No decants to waste treatment
- No hazardous wastes for shipment

Acid Purification Effects on Conventional Wastewater Treatment

- No acid dumps to neutralize
- Lower metals concentrations in acid rinses
- Less RCRA waste generated
- Less caustic used for neutralization
- Lower TDS to RO recycle water equipment

Typical Filtration Systems – Small Plants

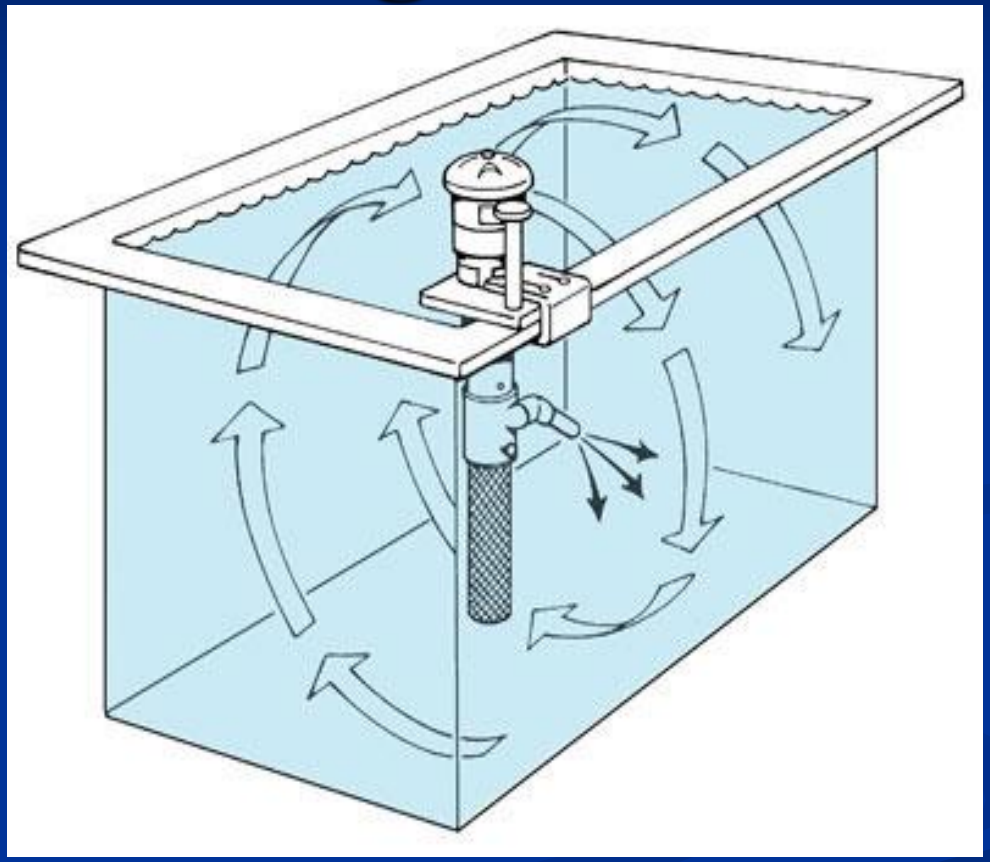
Cartridge Filter Courtesy EKSAS



Cartridge/Plate Filter/Pleated
Courtesy Siebec

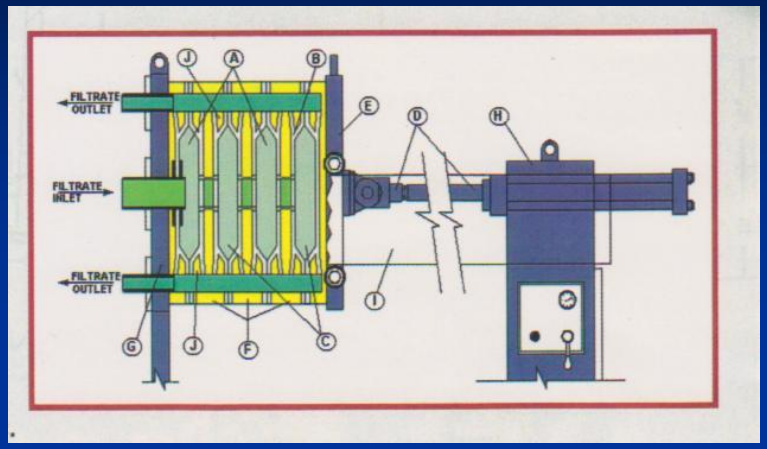
Cartridge/Bag Filter
Courtesy Serfilco

FloKing Cartridge Filter



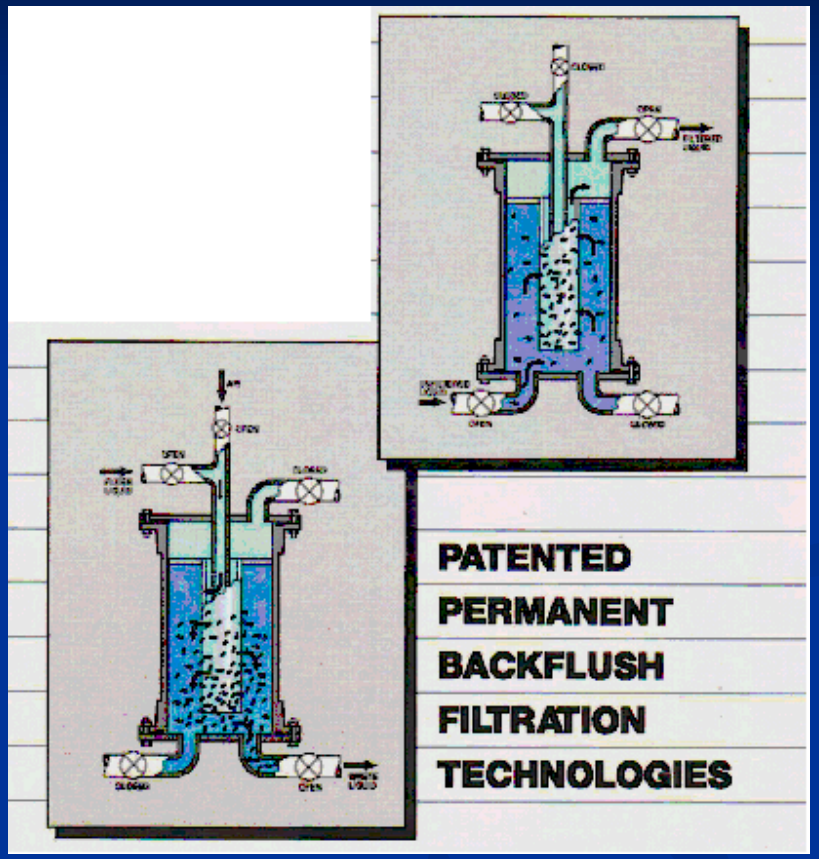
CARTRIDGE – NITRIC ACID

Typical Filtration Systems – Large Plants



Gasketed Recessed Plate Press

Courtesy Hoffland Environmental



Courtesy Global Filtrations Systems

Bag Filter Courtesy Westech

Global Filter – Automatic Backwash

Filter Dimensions and Details

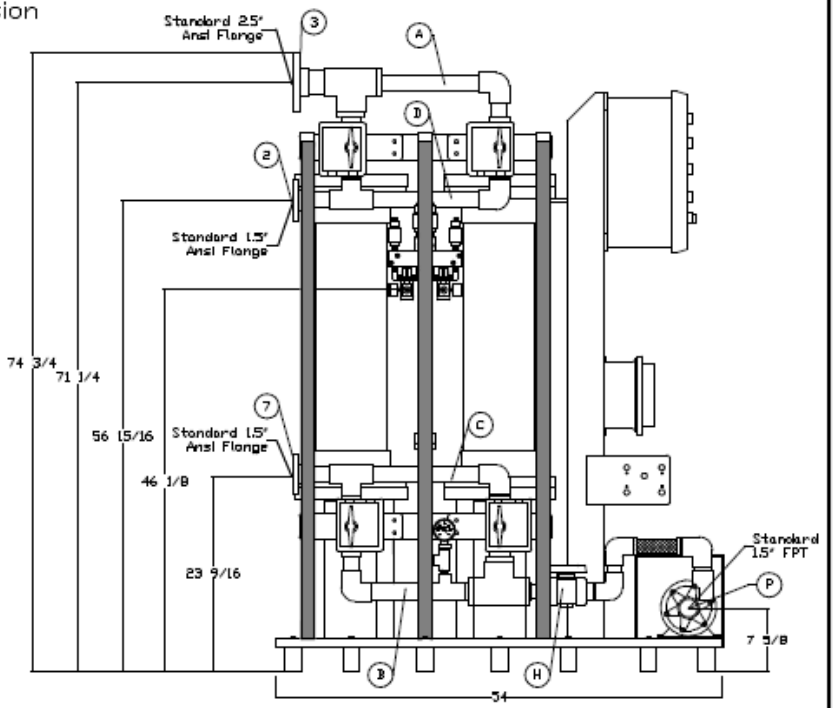
Note #1: All dimensions are ± 1 inch.

Note #2: This is a standard layout with end-mounted panel for overall purposes only.

Note #3: System base front to back dimension (not shown) is 38".

Note #4: Piping support brackets intentionally not shown.

FRONT VIEW



ITEM	DESCRIPTION
3	EN-880 Series System Discharge (Filtered) Valve #3
A	Discharge Manifold - Common
P	EN-880 Series Pump Suction (Unfiltered)
B	Inlet Manifold - Common
7	EN-880 Series System Drain (To Waste) Valve #7
C	Drain Manifold - Common
2	Backpulse Water Source Valve #2
D	Backpulse Water Manifold - Common
G	Pressure Gauge (1)
H	1-1/4" Isolation Ball Valve

	NAME	DATE
DR	M. SMITH	7/27/12
S/N		
PROD		
PATH		
WO#/CO#		

Global Filtration Systems
P. O. Box 10 – Route 25, Tamworth, NH
Phone: 603-323-7777 Fax: 603-323-7007

EN-888-2X GEN 3 Series Backpulse Filtration System With JB-1211-35 Pump

SIZE	DWG. NO.	REV
A	6526039/44-2X	0

SCALE

SHEET 1 OF 1

Utility Requirements

- 230/460/3 for pump
- 115/1 for control panel
- City water for backwash
- City water for pump seal
- Compressed air for backwash scour
- Drain to wastewater treatment for backwash

Pump and Filter connections

Piping Example

Piping Example

PRO-pHx chemical feed pump

SUMMARY

- Proven Chemistry for Acid Purification
- Eliminates Organics
- Maintains Metals at Low Levels
- Increased & Consistent Pickling / Activation Rates
- Consistent Process Quality
- Reduced Production Time
- Eliminates Acid Dumps
- Waste Minimization
- No On-site / Off-site Treatment
- Reduced Contaminants in Rinse Waters
- Possible Reduction of Generator Status
- Reduces Environmental Liability
- Operator Safety
- Return on Investment / Savings

QUESTIONS???